

72-10
An Announcement of
Highway Safety Literature
... A Bi-Monthly Abstract Journal

HSL No. 72-10 May 26, 1972

HS-010 954 - HS-011 018,
HS-820 182 & 203

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THIS ISSUE CONTAINS:

HS-010 954 - HS-011 018
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HS-820 182 & 203

U.S. Department of Transportation / National Highway Traffic Safety Administration

An Announcement of
HIGHWAY SAFETY LITERATURE
... A Bi-Monthly Abstract Journal

Published twice-a-month by the National Highway Traffic Safety Administration,
Research Institute, Office of Accident Investigation and Data Analysis
Washington, D.C. 20590

INTRODUCTION

Publications such as journal articles, proceedings, and research reports announced in *Highway Safety Literature* include some of the most recent additions to the collection of the NHTSA Scientific & Technical Information Service. Subject areas covered include all phases of highway, motor vehicle, and traffic safety, especially those encompassed by the National Traffic and Motor Vehicle Safety Act of 1966 and the Highway Safety Act of 1966.

Individual issues of *HSL* are numbered according to the year and the issue number within that year; thus, 72 designates the year and 1, 2, 3, etc. the individual issues. To aid the user in locating citations by the HS-number, the cover bears the inclusive entry number for each issue.

Entries in *HSL* are arranged according to the NHTSA Subject Category List shown in the Table of Contents. The list is a two-level arrangement consisting of five major subject fields subdivided into 59 subject groups. Documents related directly to

the National Highway Traffic Safety Administration (NHTSA) are announced in a separate section headed NHTSA DOCUMENTS and are numbered in five distinct series: NHTSA Accident Investigation Reports (HS-600 000 series), NHTSA Compliance Test Reports (HS-610 000 series), NHTSA Contractors Reports (HS-800 000 series), NHTSA Staff Speeches, Papers, etc. (HS-810 000 series), and NHTSA Imprints (HS-820 000 series). For NHTSA DOCUMENTS in series HS-600 000 and HS-610 000, individual full case reports are available for inspection at the National Highway Traffic Safety Administration. HS-800 000 series and HS-820 000 series are available for purchase from NTIS or GPO (see page ii). Although announced together in a separate section, these documents are also assigned specific subject categories for machine retrieval.

A document which contains a number of separate articles is announced as a complete volume in the subject category most applicable to it as a whole. Entries for the individual articles appear in their most specific subject category.

SAMPLE ENTRIES

Subject Category Array _____
NHSB Accession no HS-800 218 Fld. 5/21; 5/9
Title of document AN INVESTIGATION OF USED CAR
SAFETY STANDARDS--SAFETY
INDEX: FINAL REPORT. VOL. 6 -
APPENDICES G-L
Personal author(s) by E. N. Wells; J. P. Fitzmaurice; C. E.
Guilliams; S. R. Kalin; P. D. Williams
Corporate author Operations Research, Inc.
Collation _____
Publication date 1969 150p
Contract FH-11-6921
Report no. ORI-TR-553-Vol-6; PB-190
523
Abstract Appendices G-L to this study of used
car safety standards include: indeture
model diagrams for classes I-IV motor
trucks; degradation, wear, and failure
data for motor truck classes I-IV; and
safety index tables for classes I-IV
motor trucks.

Search terms; Wear; Trucks;
Failures; Used cars; Inspection
standards

AVAILABILITY: NTIS

HS-004 497 Fld. 5/19

**AUTO THEFT--THE PROBLEM AND
THE CHALLENGE**

by Thomas A. Williams, Sr.

Journal citation Published in *FBI Law Enforcement
Bulletin* v37 n12 p15-7 (Dec 1968)

Gives figures on the extent of the auto
theft problem and comments on anti-
theft devices available now or in the
planning stage.

Search terms: Theft; Theft pro-
tection; Stolen cars

(Note: If the date of a report or
Journal article is not given, the small
letters nd will appear)

TABLE OF CONTENTS

NOTE: () Numbers in parentheses following certain subject groups indicate the Highway Safety Program Standards (No. 1, and up) and/or Federal Motor Vehicle Safety Standards (No. 101 and up) which may apply to these groups.

INTRODUCTION AND

SAMPLE ENTRIES	Inside Front Cover
AVAILABILITY OF DOCUMENTS	iii

NHTSA SUBJECT FIELDS AND GROUPS

1/0 ACCIDENTS	1
/1 Emergency Services (11, 15-16)	
/2 Injuries	
/3 Investigation (10, 14-15)	
/4 Locations (9, 14)	
/5 Statistical data	
2/0 HIGHWAY SAFETY	4
/1 Breakaway Structures	
/2 Communications	
/3 Debris Hazard Control and Cleanup (15-16)	
/4 Design and Construction (12, 14)	
/5 Lighting (14)	
/6 Maintenance (12)	
/7 Meteorological Conditions	
/8 Police Traffic Services (15)	
/9 Traffic Control (13-14)	
/10 Traffic Courts (7)	
/11 Traffic Records (10)	
3/0 HUMAN FACTORS	6
/1 Alcohol (8, 14)	
/2 Anthropomorphic Data	
/3 Cyclists	
/4 Driver Behavior	
/5 Driver Education (4, 14)	
/6 Driver Licensing (5, 10, 14)	
/7 Drugs Other Than Alcohol	
/8 Environmental Effects	
/9 Impaired Drivers	
/10 Passengers	
/11 Pedestrians (14-15)	
/12 Vision	

4/0 OTHER SAFETY-RELATED AREAS	10
/1 Codes and Laws (6)	
/2 Community Support (17)	
/3 Cost Effectiveness	
/4 Governmental Aspects	
/5 Information Technology	
/6 Insurance	
/7 Mathematical Sciences	
/8 Transportation Systems	
5/0 VEHICLE SAFETY	12

* All Federal Motor Vehicle Safety Standards apply to passenger vehicles. An asterisk before a subject group indicates additional types of vehicles to which the indicated standards may apply.

/1 Brake Systems (102, 105-6, 116)	
* /2 Buses, School Buses, and Multipurpose Passenger Vehicles (102-4, 106-8, 111-3, 116, 205-6, 209, 211)	
* /3 Cycles (3; 108, 112, 116, 205)	
/4 Design (14; 101-2, 105, 107, 201)	
/5 Door Systems (201, 206)	
/6 Fuel Systems (101, 301)	
/7 Glazing Materials (205)	
/8 Hood Latch Systems (113)	
/9 Inspection (1)	
/10 Lighting Systems (101, 105, 108, 112)	
/11 Maintenance and Repairs	
/12 Manufacturers, Distributors, and Dealers	
/13 Mirrors and Mountings (107, 111)	
/14 Occupant Protection (15; 201-4, 207-10)	
/15 Propulsion Systems	
/16 Registration (2, 10)	
/17 Safety Defect Control	
/18 Steering Control System (101, 107, 203-4)	
/19 Theft Protection (114-5)	
* /20 Trucks and Trailers (102-4, 107-8, 112-3, 116, 205-6, 209)	
/21 Used Vehicles	
/22 Wheel Systems (109-10, 211)	
/23 Windshield-Related Systems (101, 103-4, 107, 205, 212)	

NHTSA DOCUMENTS	17
EXECUTIVE SUMMARIES	-

NOTE: Material published in Highway Safety Literature (HSL) is intended for the information and assistance of the motor vehicle and highway safety community. While brand names, equipment model names and identification, and companies may be mentioned from time to time, this data is included as an information service. Inclusion of this information in the HSL should not, under any circumstances, be construed as an endorsement or an approval of any particular product, course, or equipment by the U.S. Department of Transportation, National Highway Traffic Safety Administration.

Harry A. Feinberg
Managing Editor

AVAILABILITY OF DOCUMENTS AND INSTRUCTIONS FOR ORDERING

Articles and reports whose citations and abstracts appear in HSL are acquired from many sources, such as periodicals, journals, NHTSA Contractors' reports and NHTSA staff speeches, and other reports. Those reports other than NHTSA Contractors' reports and NHTSA generated reports and speeches (see introduction) are assigned a lower consecutive accession (HS-) number.

Department of Transportation personnel may borrow copies of publications announced in HSL from the NHTSA Technical Reference Division. Non-DOT Personnel, in the Washington, D.C. area, may borrow copies of publications for a 24-hour period only. Telephone (202) 426-2768. Government personnel in the Washington, D.C. area, use government ID phone 118-62768.

The names of the journals cited in HSL appear in *italic type* preceded by the words "Published in." The journal containing the article cited may be borrowed from most research and public libraries. Non-DOT personnel outside the Washington area should contact their company or agency libraries for assistance.

NHTSA Contractors' reports and other reports can usually be obtained as indicated under AVAILABILITY. However, there is no certainty that copies will be available for more than a limited period after a report is issued.

The more common availability sources are identified by symbols which are explained in the next column:

NTIS: National Technical Information Service, Springfield, Va. 22151. Order by accession number: HS, AD, or PB. Prepayment is required by NTIS coupon (GPO coupons are not acceptable), check or money order (made payable to the NTIS). PC (Paper copy; full size original or reduced facsimile) prices are \$3.00 up to 300 pages, \$6.00 for 301 to 600 pages, \$9.00 for 601 to 900 pages, and over 900 pages will be quoted on request. Surcharge is added for foreign orders. MF (microfiche approximately 4x6" negative sheet film; reader required) is \$0.95 per report.

GPO: Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Give corporate author, title, personal author, and report number. Prepayment is required by GPO coupon (NTIS coupons are not acceptable), check or money order (made payable to the Superintendent of Documents).

HRB: Highway Research Board, National Academy of Sciences, 2101 Constitution Ave., N. W., Washington, D. C. 20418.

NHTSA: National Highway Traffic Safety Administration, General Services Division, Washington, D.C. 20591 (Telephone (202) 426-0874), Give HS-No.

SAE: Society of Automotive Engineers, Dept. HSL, 2 Pennsylvania Plaza, New York, N.Y. 10001. Order by SAE report numbers. Prices given are list; discounts are available to SAE members and sometimes to libraries and U.S. Government Agencies. Prepayment is required; orders received without payment are subject to a \$1 handling charge.

IMPORTANT NOTICE

WHEN REQUESTING a document, to be absolutely sure you receive what you order, give the accession number (HS, PB, AD number) or report number (in cases such as an SAE document), title of report, and the personal or corporate author (whichever is cited). When requesting an HS-numbered document from NTIS, add DOT/to the prefix HS-; example HS-800 000 should be ordered as DOT/HS-800 000.

1/0 ACCIDENTS

1/1 Emergency Services

HS-010 954 Fld. 1/1

THE CHALLENGE OF THE TRAUMA PROBLEM TO ORGANIZED MEDICINE

by Oscar P. Hampton, Jr.

Published in *Journal of Trauma* v10 n11 p926-31 (Nov 1970)

10refs

The current status of programs for prevention of injuries and prehospital and in-hospital management of trauma victims presents a challenge to organized medicine. Members of medical organizations should encourage and help bring about: adequate safety regulations (implementation of the standards of the National Highway Safety Bureau would accomplish it); an effective system of emergency medical services in their communities; the promotion, provision, and participation in continuing medical education in the life-saving techniques for the critically injured for physicians, particularly those who are not surgical specialists; and support of the concept of regional categorization of hospitals according to their capabilities, with the understanding that trained emergency medical technicians will take injured patients to the best organized and qualified institutions to render life-saving care, regardless of previous or future physician-patient relationships.

Search terms: Medical emergencies; Injury prevention; Postcrash phase; Hospital emergency room standards; Emergency medical services; Ambulance personnel training; Medical education; Transportation of injured; Medical treatment; Highway safety standards; Community support; Physicians and highway safety; Hospitals; First aid; Highway safety programs

1/2 Injuries

HS-010 955 Fld. 1/2

NEURO-OPHTHALMOLOGIC SYNDROMES IN AUTOMOBILE ACCIDENTS

by J. Donald Fite

Published in *Southern Medical Journal* v63 p567-70 (May 1970)

9refs

Presented before the Section on Ophthalmology, Southern Medical Association, sixty-third annual meeting, Atlanta, Georgia, 10-13 Nov 1969.

The neuro-ophthalmologic syndromes of whiplash injury, traumatic carotid-cavernous sinus fistula, isolated 4th nerve paralysis, and chiasmal contusion were seen in patients involved in automobile accidents. A correlation of the clinical findings, nature of the accident, and pathologic studies demonstrates the mechanisms responsible for some of these syndromes.

Search terms: Vision disorders; Whiplash injuries; Paralysis; Nervous system; Injury case reports; Neurologic manifestations

HS-010 956 Fld. 1/2

FLEXION FRACTURE OF THE LUMBAR SPINE DUE TO LAP-TYPE SEAT BELTS

by Edward Greenbaum; Lee Harris; W. X. Halloran

Published in *California Medicine* v113 p74-6 (Sep 1970)

31refs

Seat belt fracture in the case herein reported resulted from wearing the seat belt high over the abdomen at the level of the umbilicus rather than over the pelvis. In injuries of this kind, at the

time of impact the belt acts as a fulcrum around which the body pivots, directing the major vector of force toward the lumbar spine. This may result in one of several injury patterns. There may be gross separation of the posterior elements due to rupture of the posterior supporting ligamentous structures, or the force may be entirely absorbed by the osseous structures. In the latter instance there is a horizontal splitting fracture of the neural arch which extends through the lamina and pedicles to involve both transverse processes.

Search terms: Seat belt caused injuries; Injury case reports; Spinal fractures; Lumbar spine; Seat belt positioning; Ruptures

1/3 Investigation

HS-010 957 Fld. 1/3

THE FACTORS APPROACH TO FLEET ACCIDENTS

by J. Howard Winchester

Published in *Traffic Safety* v71 n10 p12-3, 36-7 (Oct 1971)

An insurance company loss-prevention specialist suggests ways to cut accidents. Accident cost control involves seven factors: Frequency of accidents; age and training of drivers; causes of accidents—usually human error; turnover and high accident rates of new employees; type of operations; accident repeater drivers; and accident severity.

Search terms: Fleet management; Fleet safety; Driver age; Accident costs; Age factor in accidents; Accident severity; Accident repeater drivers; Driver error caused accidents; Accident rates; Driver experience; Truck drivers; Safety programs; Fleet driver training; Accident causes

HS-010 958 Fld. 1/3

DIE BEGUTACHTUNG VON STRASSENVERKEHRSUNFÄLLEN (EXPERT INVESTIGATION OF TRAFFIC ACCIDENTS)

by Helgo Schneider

Technischer Überwachungsverein Bayern (W. Germany)

Published in HS-010 963, *Conference on Road Safety. Vol. 4. Automobile Experts*, Brussels, 1968 pC2-(1-19)

Text in German. Summaries in English, French, and Dutch.

The importance of all measures taken in order to study and to investigate accidents is stressed. The reconstitution and the causal explanation of accidents, as done by automobile experts, are not less important. Unfortunately, the expert often finds his task made very difficult because of errors made or facts overlooked when the first accident report was written. When this is the case, the expert should draw attention to the gaps in his information and the consequent limitations of his own report.

Search terms: Accident investigation; Accident reconstruction; Accident statistics; Defective vehicles; Failure caused accidents; Accident reports; Accident causes; West Germany; Accident factors

HS-010 959 Fld. 1/3; 1/5

UNFALLVERHÜTUNG UND UNFALLAUFKLÄRUNG MIT HILFE DES FAHRTSCHREIBERS (PREVENTION OF ACCIDENTS AND ASCERTAINMENT OF THEIR CAUSES BY MEANS OF THE TACHOGRAPH)

by S. Eckle

Published in HS-010 963, *Conference on Road Safety. Vol. 4, Automobile Experts*, Brussels, 1968 pC4-(1-27)

Text in German. Summaries in English, French, and Dutch.

For the examination of the principal traffic offenses, the tachograph is a reliable and simple technical means of information, investigation, and education. Considered as a means of observing the driver's behavior, it can be used as an objective base for driver education, and for the prevention of accidents. As speed is the principal cause of accidents, the data given by the tachograph, on speed, time, and distance, allow precise analysis of accidents and determination of their causes.

Search terms: Tachographs; Speed recorders; Accident causes; Accident investigation; Accident prevention; Driver behavior; Driver performance; Europe; Injury statistics; Fatalities

HS-010 960 Fld. 1/3; 3/1; 5/20

MOTOR CARRIER ACCIDENT INVESTIGATION. DEWEY ENTERPRISES. ACCIDENT — DECEMBER 19, 1970 — ONTARIO, OREGON

Bureau of Motor Carrier Safety

1970 13p
Report no. 70-10

On December 19, 1971, at 11:30 a.m., on U.S. Highway 91, 20 miles southwest of St. George, Utah, a tractor-semitrailer combination, coasting down a steep grade, ran off the road on a curve, struck a fence, and overturned. The truck driver was killed, his co-driver injured, and the truck was destroyed. Cause of accident: the truck driver was of questionable emotional stability, had a deplorable driving record of 52 violations, and had been consuming brandy at the wheel just before the accident.

Search terms: Accident case reports; Truck drivers; Driver fatalities; Loss of control caused accidents; Ran off road

accidents; Drinking drivers; Truck overturn accidents; Driver mental fitness; Driver personality; Driver records; Traffic law violations; Tractor semitrailers; Problem drivers; Accident investigation

HS-010 961 Fld. 1/3; 4/7

METHODOLOGICAL ISSUES IN TRAFFIC SAFETY RESEARCH

by Harold D. Warner

Published as chapter 9 of *Injury Control in Traffic Safety*, Springfield, 1970 p201-24

32refs

A framework of scientific methodology for specifying the conditions for testing causal relationships in accidents is provided. For experimental control the test variables must be isolated; however, accidents involve interdependently the driver, vehicle, and environment. Therefore, in addition to the basic methodology, an organizational model is necessary to coordinate the interrelated system. The discussion concerns driver, vehicle, and environmental factors, experimental designs and problems, naturalistic versus laboratory research, bias and corrective measures, and data sampling.

Search terms: Research methods; Accident research; Accident causes; Driver vehicle road interfaces; Psychological factors; Epidemiology; Data acquisition; Driver behavior; Man machine systems; Accident factors; Environmental factors; Variables; Laboratory tests; Road tests; Sampling; Information modeling

HS-010 962 Fld. 1/3; 5/11

L'EXPERT ET LA SECURITE ROUTIERE (THE AUTOMOBILE EXPERT AND ROAD SAFETY)

by J. Barataud

Syndicat National des Experts (France)

Published in HS-010 963, *Conference on Road Safety. Vol. 4, Automobile Experts*, Brussels, 1968 pC1-(1-7)

Text in French. Summaries in English, Dutch and German.

Many accidents are due to faulty repairs or the use of vehicles which, having been declared a total loss, have nevertheless been put on the road again. In order to fight these practices, a proposed law has been submitted to the French Parliament, so that damaged vehicles would have to be examined by official experts. This law would prescribe that a severely damaged vehicle is to be taken off the road and that the adequacy of repairs is to be strictly ascertained. Only technical experts in the automobile field, holders of the official certificate, would make the necessary verifications.

Search terms: Vehicle inspection; Repairing; Automobile certification; Defect correction; Failure caused accidents; France; Automobile repair after accident; Defective vehicles; Totally wrecked vehicles

HS-010 963 Fld. 1/3; 5/11

CONFERENCE ON ROAD SAFETY. VOL. 4. AUTOMOBILE EXPERTS

Fonds d'Etudes et de Rech. la Sec. Rout. (Bel.)

1968 125p

Text in English, French, Dutch and German. Includes HS-010 958, 959, 962, 964, 977.

European authorities on road safety discuss the importance of the automobile expert in road safety, traffic accident investigations, total wreck assessment, use of specialized tools in determining accident causes, and his social responsibilities for improving road safety.

Search terms: Repairing; Defects; Accident investigation; Accident prevention; Accident studies; Tachographs; International factors; Europe; Totally wrecked vehicles

HS-010 964 Fld. 1/3; 5/11

LE SINISTRE TOTAL (THE TOTAL WRECK)

by Y. Wolters

Ordre des Experts Automobile (Belgium)

Published in HS-010 963, *Conference on Road Safety. Vol. 4, Automobile Experts*, Brussels, 1968 pC3-(1-18)

Text in French. Summaries in English, Dutch and German.

The evolution of economic factors influencing an expert's conclusions has made "total wrecks" more frequent. These can be divided into three main categories. A vehicle can be declared a total wreck for: technical reasons (cannot be adequately repaired), economic reasons (cost of repair equals or exceeds the value of the vehicle), or loss by forfeit. According to their category, the vehicles which have been declared total wrecks by the experts have different fates, some even being repaired for re-use, and some used to provide spare parts. Regulations of nearby countries pertaining to total wrecks are commented on.

Search terms: Defective vehicles; Repairing; International factors; Totally wrecked vehicles; Repair costs; Belgium; Europe; Defects; Vehicle laws

HS-010 965 Fld. 1/3; 5/20

MOTOR CARRIER ACCIDENT INVESTIGATION. ALUMINUM BILLETS, INC. ACCIDENT — SEPTEMBER 28, 1970 — NAPOLEON, OHIO

Bureau of Motor Carrier Safety

1970 10p
Report no. 70-11

On September 28, 1970, at 2:50 p.m., on U.S. Highway 6, near Napoleon, Ohio, a tractor semitrailer collided with the rear of a stopped automobile pushing it into a second car. Both vehicles were then thrust forward into another tractor semitrailer. Fire ensued. There were four fatalities; the driver and two occupants of the first car struck were burned to death; the sole occupant of the second car was also killed. Both commercial drivers were injured. Property damage amounted to \$28,000. Cause of the accident: the driver, suffering from hypertension, was using medication for this condition on the involved trip, and either fell asleep or blacked out. He was exceeding hours of service limitations.

Search terms: Truck accidents, Rear end collisions; Property damage accidents; Multiple vehicle accidents; Driver fatigue caused accidents; Accident caused fires; Driver physical fitness; Drug effects; Tractor semitrailers; Vehicle fires; Driver fatalities; Passenger fatalities; Work time standards; Sleep; Accident investigation; Accident case reports

HS-010 966 Fld. 1/3; 5/20

MOTOR CARRIER ACCIDENT INVESTIGATION. MILLER'S MOTOR FREIGHT, INC. ACCIDENT — JANUARY 7, 1971 — FAIRVIEW, NEW JERSEY

Bureau of Motor Carrier Safety

1971 9p
Report no. 71-1

1/3 Investigation (Cont'd.)**HS-010 966 (Cont'd.)**

On January 7, 1971, at 8:43 a.m. on New Jersey route 168, Fairview, New Jersey, the driver of a tractor-semitrailer combination suffered a fatal heart attack. The tractor-semitrailer with the unconscious or expired driver at the wheel ran over a curb, struck a light standard and a sign, collided with a passenger automobile, swerved back across the street, then struck a house, two fences, and a second house. Damage to truck and property damage amounted to \$3,200. The driver had a long history of heart trouble and died of acute myocardial infarction.

Search terms: Accident case reports; Truck accidents; Property damage accidents; Truck drivers; Driver physical fitness; Driver fatalities; Medical factor caused accidents; Loss of control caused accidents; Accident investigation; Myocardial infarct

HS-010 967 Fld. 1/4; 1/5**HIGHWAY SAFETY RESEARCH STUDY**

by Murray D. Segal

Maine State Hwy. Commission

1971 100p

Study objectives were to expand the data in the existing highway description system and to investigate relationships between highway design and operation and accidents. Most of the 4,600 miles studied were rural, two-lane roads with low traffic volumes. Data base was an accident file for 1966-68 and a highway description file. Types of locations with unusually high accident rates are noted, suggestions made for improvements, and data processing and statistical analysis methods described.

Search terms: Traffic control devices; Accident statistics; Accident rates; Injury rates; Accident location; Traffic volume; Statistical analysis; Accident factors; Maine; Rural accidents; Urban accidents; Intersection collisions; Variables; Accident studies; Highway accident potential; Time of accidents; Pedestrian accidents; Accident types; Driver characteristics; Data processing

1/5 Statistical data**HS-010 968 Fld. 1/5; 1/3; 5/20****TRACTOR ACCIDENTS IN AUSTRALIA**

by W. F. Baillie; I. W. Grevis-James

Melbourne Univ. (Australia)

13p

Report no. Ag-Eng-1/66

It is estimated that tractor accidents account for about 100 deaths and 8,000 non-fatal serious injuries each year in Australia. From a collection of newspapers, the primary reporting source of tractor accidents, it was determined that about 4 deaths occur annually per 10,000 tractors, but in hilly farming regions, death rates may reach 25 per 10,000 tractors. Drivers under 25 and over 45 are most involved, with over-returns representing 63% of all accidents. Suggestions for improved tractor safety are included.

Search terms: Accident statistics; Fatality rates; Australia; Farm tractor accidents; Age factor in accidents; Driver age; Aged drivers; Adolescent drivers; Topographical factors; Accident types; Rollover accidents; Injury rates; Accident prevention

HS-010 969 Fld. 1/5; 1/3; 5/20**AGES OF DRIVERS IN TRACTOR ACCIDENTS**

by W. F. Baillie; I. W. Grevis-James

Melbourne Univ. (Australia)

1967 13p 2refs
Report no. Ag-Eng-4/67

Based on 224 accident reports and a survey of drivers and tractor usage, risk factors are estimated for tractor operations in Victoria, Australia. Data include age distribution and hours spent driving. Risk was very high for the 15 to 19 year age group—probably due to inexperience; lower and fairly uniform for ages 20 to 49, and then progressively rising so that the 55 to 59 group has as high a risk as the 15 to 19 group. Risk for those over 60 is still higher. Education for young drivers, warning those over 50 years of the risks, and redesign of tractors for manageability are suggested.

Search terms: Driver age; Driver experience; Australia; Questionnaires; Accident statistics; Accident rates; Farm tractor accidents; Age factor in accidents; Accident risk forecasting; Adolescent drivers; Young adult drivers; Adult drivers; Aged drivers

2/0 HIGHWAY SAFETY**HS-010 970 Fld. 2/0; 4/2****UTAH'S HIGHWAY SAFETY PROGRAM. A REPORT TO THE GOVERNOR OF THE STATE OF UTAH FROM THE STATE COMMISSIONER OF PUBLIC SAFETY**

Utah Dept. of Public Safety

1968 64p

Rept. for 1 Jul 1967-30 Jun 1968.
Cover title: *A Report on Highway Safety Program Activities.*

The first year of the highway safety program in Utah has seen several accomplishments: the structural organization of the program was formalized; various highway safety projects were developed in priority areas of the program; work was begun on the report of the total state program; and Utah's total monetary allocation was expended in priority

projects. The most important aspect of the first year's activities is that for the first time an organization has been developed through which a total state program of highway safety activities can be administered. Projects undertaken since the Highway Safety Act of 1966 are described, together with progress achieved in meeting highway safety standards.

Search terms: Highway Safety Act of 1966; Highway safety organizations; State action; Federal state relationships; Federal aid; Financing; Safety standards compliance; Highway safety programs; Utah; Priorities; Highway safety standards

2/5 Lighting

HS-010 971 Fld. 2/5

IMPACT BEHAVIOR OF LUMINAIRE SUPPORTS

by Neilon J. Rowan; E. W. Kanak

Texas A and M Univ. Texas Transp. Inst.

1967 11p 5refs
Report no. 75-8(S)

Prepared in cooperation with Bureau of Public Roads.

Full scale impact tests of luminaire support designs showed: the steel transformer base results in severe impacts and should not be used; forty-foot flange mounted supports of aluminum or steel also were undesirable; the cast aluminum transformer base satisfactorily reduced impact severity; and a cast aluminum insert under a steel transformer base was satisfactory as a remedial measure (it does not appear feasible for new design).

Search terms: Luminaires; Steels; Aluminum; Pole impact tests

2/6 Maintenance

HS-010 972 Fld. 2/6

MAINTENANCE AND HIGHWAY SAFETY HANDBOOK

Highway Users Federation for Safety and Mobility

1970 71p

Photographs and narrative examples of roadway hazards and scenes of good and bad maintenance operations are provided as a reference guide for maintenance crews. Aspects included are: pavements, skid hazards, road shoulders, roadside hazards, drainage, guardrails and guideposts, signs, pavement markings, snow and ice control, and maintenance crew safety.

Search terms: Manuals; Highway maintenance; Roadside maintenance; Roadside hazards; Photographs; Construction sites; Highway improvements; Pavement skidding characteristics; Highway signs; Road shoulders; Drainage; Guardrails; Guardrail posts; Pavement markings; Snow removal; Ice removal

2/9 Traffic Control

HS-010 973 Fld. 2/9

ROUNDBABOUTS AND SIGNALS

by R. S. Millard

Published in *Traffic Engineering and Control* v13 n1 p13-5 (May 1971)

16refs

Roundabouts, or traffic circles, are often favored in Britain over signalized intersections. Differences between the two forms of junction control are land use—corner plots versus long narrow strips; delay to side road traffic with circles when flow is unbalanced; problems caused by off-side turns; unsatisfactory treatment of traffic lights at three-way

junctions. Area traffic control for groups of urban junctions is discussed.

Search terms: Traffic control; Traffic circles; Traffic capacity; Great Britain; Left hand rule of the road; Right turns; Area traffic control; Signalized intersections; Traffic signals; Urban traffic flow; Urban intersections; Land usage; Traffic delay minimization

HS-010 974 Fld. 2/9; 1/5

RIGHT TURN ON RED: ACCIDENT STUDY. FINAL REPORT

Minnesota Dept. of Highways

1971 12p
Project 75-350-346
Report no. PB-199 471; AB-2529

Prepared in cooperation with the Federal Highway Administration.

Installation of "right turn on red" signs at selected intersections reduced motorist delay for right turning vehicles by 47%. Limited "before and after" accident data provided no definite conclusions regarding right turn on red accident experience. Based upon that data, no reason can be given to support banning of "right turn on red" intersections nor specific warrants for their installation. Actual hazard to pedestrians appears to be minimal.

Search terms: Right turn on red; Accident location; Traffic surveillance; Traffic delay minimization; Minnesota; Accident statistics; Traffic control; Intersections; Chi square test

AVAILABILITY NTIS \$3.00 as PB-199 471

HS-010 975 Fld. 2/9; 4/8

RESERVED LANES SHORTEN COMMUTING TIME

Published in *Metropolitan* v67 n5 p25-6 (Sep-Oct 1971)

2/9 Traffic Control (Cont'd.)

HS-010 975 (Cont'd.)

The success of reserved bus lane experiments in many areas has saved commuters time and money. Described are projects in Virginia, New York, New Jersey, Seattle, the San Francisco-Oakland Bay Bridge, and the Golden Gate Bridge. An 11-mile busway will be built in Los Angeles, and busways in Pittsburgh are being designed.

Search terms: Bus lanes; Public transportation usage; Demonstration projects; Travel time; Fringe parking

HS-010 976 Fld. 2/9; 5/4

THE ROAD RESEARCH LABORATORY'S WORK ON DUAL-MODE ROAD VEHICLES

by S. Penoyre

Published in *Traffic Engineering and Control* v13 n5 p189-91 (Sep 1971)

2refs

The dual mode vehicle concept involves fitting normal cars with automatic equipment which would be used on major roads and motorways but not on minor roads. The technical problems of vehicle automation fall into two areas, lateral control (steering) and longitudinal control (throttle and brake). A choice between mechanical and electronic guidance systems must be made. The Road Research Laboratory is using an electronic guidance system with a cable buried in the road. Problems of following distance are discussed. The cost benefit analysis of large-scale road vehicle automation in Britain is briefly discussed.

Search terms: Automatic control; Automatic highways; Dual mode vehicles; Benefit cost analysis; Guidance systems; Great Britain; Vehicle guid-

ance; Automatic headway control; Automatic steering control; Automatic braking; Throttling; Electronic devices

3/0 HUMAN FACTORS

HS-010 977 Fld. 3/0

EXPERTISE EN AUTOMOBILES ET RESPONSABILITES SOCIALES (AUTOMOBILE EXPERTS AND THEIR SOCIAL RESPONSIBILITIES)

by A. Rutten

Conseil de la Securite Routiere (Belgium)

Published in HS-010 963 *Conference on Road Safety. Vol. 4, Automobile Experts*, Brussels, 1968 pC5-(1-18)

Text in French. Summaries in English, Dutch, and German.

Men must adapt themselves to their new responsibilities: the automobile too often causes death or ruin, and thus, conflicting interests frequently arise. Automobile experts have an important role to play, not only in helping to settle these conflicts, but also in working to prevent this evil by actively taking part in the fight for better road safety. These two aspects of their social duty bring them some additional obligations, and should cause the appropriate authorities to enact statutes which would disqualify those who have neither the knowledge nor the moral qualities needed.

Search terms: Accident prevention; Highway safety organization management; Ethics; Public policy; Sociological factors; Europe

3/1 Alcohol

HS-010 978 Fld. 3/1

EFFECTS OF ALCOHOLIC BEVERAGES AND CONGENERS ON PSYCHOMOTOR SKILLS IN OLD AND YOUNG SUBJECTS

by Arthur S. Wilson; Joseph J. Barbo-riak; Warren A. Kass

Published in *Quarterly Journal of Studies on Alcohol* v5 supp5 p115-29 (May 1970)

11refs

Two groups of 30 volunteers each, one aged 60 to 85 and the other 21 to 35, were given three psychomotor tests, before and 0.5 hours after drinking vodka, bourbon (both containing 0.75g of alcohol per kg of body weight), or water. In all three tests the young performed better than the old after water, while alcohol impaired the performance of the young more than that of the old. On the digit symbol test vodka decreased speed and accuracy in both groups. On the hand steadiness test the performance of the two groups was similar after alcohol. The old group performed better after bourbon or vodka than after water, while the young performed better after water than after bourbon or vodka. On the body sway test the young swayed less than the old after alcohol. The hypothesis that bourbon would be more detrimental than vodka was not clearly demonstrated.

Search terms: Alcohol effects; Psychological tests; Laboratory tests; Alcoholic beverages; Age factors; Motor skills; Neurologic manifestations; Metabolism; Aged; Test volunteers; Young adults; Adults; Reaction time; Congeners; Vodka; Whiskey

HS-010 979 Fld. 3/1;1/3

ANALYSIS OF STUDIES COMPARING COLLISION-INVOLVED DRIVERS AND NON-INVOLVED DRIVERS

by Richard Zylman

Published in *Journal of Safety Research* v3 n3 p116-28 (Sep 1971)

37refs

The five studies of the relationship between alcohol and collisions that included "non-accident" populations are frequently misquoted, misread, or the subject of unwarranted generalizations. Those studies by Holcomb, Lucas, Vamosi, McCarroll, and Borkenstein were unique, the methodologies varied widely, and the populations studied were distinctive; any grouping of data or comparisons between or among these studies may lead to spurious conclusions. These studies are now mainly of historic interest, but with public and financial support, their methodologies could be adapted to identify and measure many variables for traffic safety programs.

Search Terms: Accident risks; Driver characteristics; Driver intoxication; Accident free drivers; Drinking drivers; Problem drivers; Driver records; Driver behavior research; Accident rates; Accident repeater drivers; Blood alcohol levels; Time of day; Statistical analysis; Accident studies

HS-010 980 Fld. 3/1; 3/4

ALCOHOL AND DRIVING: AN OVERVIEW

by Gary L. Martin

Published as chapter 5 of *Injury Control in Traffic Safety*, Springfield, 1970 p108-28

27refs

The drinking driver is described in terms of epidemiology. Previous studies of

alcohol effects on driving behavior are reviewed and their faults and findings noted. Alcohol effects on the human body are discussed. Needed research on alcohol countermeasures is described, with comments on methodology.

Search terms: Drinking drivers; Alcohol effects; Driver behavior research; Epidemiology; Blood alcohol levels; Driver intoxication; Driver performance; Research methods

HS-010 981 Fld. 3/1; 3/11; 1/2

FATAL PEDESTRIAN ACCIDENTS IN WEST VIRGINIA, CALENDAR YEAR 1970

by Bernard H. Clark

1971 66p 6refs

Master's thesis, West Virginia Univ.

The purpose of this study was to determine if alcohol is a significant factor in fatal accidents to pedestrians in West Virginia for 1970. Results show that 26% of the fatal pedestrian accidents involved alcohol; 47% of the pedestrians who were drinking prior to the fatal accident had a prior public intoxication arrest; 25% of the drivers who were drinking just prior to the fatal accident had prior records of being convicted for drunken driving. The report also shows that a large number of young pedestrians lost their lives and that the largest percentage of these accidents occurred in daylight hours. In those cases where alcohol was present, the largest percentage of the fatal accidents occurred at night. Alcohol was present in all age groups.

Search terms: Drinking pedestrians; Pedestrian fatalities; Fatalities by age; Pedestrian age; Drinking drivers; Time of accidents; Blood alcohol levels; Day of week; West Virginia; Pedestrian accidents; Accident studies; Driver intoxication; Pedestrian intoxication; Age factor in accidents; Statistical analysis; Young pedestrians

3/3 Cyclists

HS-010 982 Fld. 3/3

SELECTED BICYCLE SAFETY INSTRUCTIONAL METHODS AND CONTENT WITH APPLICATION TO THE HIGHWAY TRANSPORTATION SYSTEM

by James E. Aaron; Scot N. Krause

Southern Illinois Univ.

1971 304p 44refs
Contract SEE-35-092-71

The primary purpose of this investigation was the determination of selected bicycle safety instructional methods and content. A secondary purpose was the development of an instructional package of newly developed curriculum materials in the bicycle safety area. Bicycle rider tasks were analyzed, a questionnaire developed on student riding habits, and a skill test and test range developed to study correct and incorrect riding behavior. Study was made with 70 elementary school students. The literature on bicycle safety education was reviewed. Eight recommendations are made for further study on the teaching of bicycle riding skills, the development of curriculum and instructional media, and the establishment of a statewide performance skill test.

Search terms: Bicycle accidents; Bicycle handling; Bicycle rider behavior; Child safety education; Bicycle rider age; Curricula; Questionnaires; Reviews; Instruction materials; Bicycle rider skill tests; Bicycle safety; Bicycle characteristics

3/4 Driver Behavior

HS-010 983 Fld. 3/4

EFFECTS OF EXPERIENCE ON PATTERNS OF DRIVING SKILL

by Kent A. Kimball; Vernon S. Ellingstad; Roger E. Hagen

3/4 Driver Behavior (Cont'd.)**HS-010 983 (Cont'd.)**

Published in *Journal of Safety Research* v3 n3 p129-35 (Sep 1971)

13refs

The present investigation utilized a point light source driving simulator, which has been validated against on-the-road criteria, to evaluate the effects of driving experience on patterns of psychomotor performance in the driving task. Results are presented which demonstrate that various groups of subjects with different levels of driving experience can reliably be discriminated on the basis of a battery of psychomotor performance tests. Exception is taken to experimental designs which treat individual driving skill measures in isolation, and evidence is presented in favor of a multivariate approach to the analysis and evaluation of the driving task.

Search terms: Driver experience; Driver performance; Motor skills; Driving simulators; Driving task analysis; Driver skills; Multiple discriminate analysis; Driver tests

HS-010 984 Fld. 3/4**ATTITUDES, PERSONAL CHARACTERISTICS, AND DRIVER BEHAVIOR**

by Richard L. Lucas

Published as chapter 6 in *Injury Control in Traffic Safety*, Springfield, 1970 p129-53

20refs

The current view concerning the relationship between attitudes, personal characteristics, and driving behavior is presented. The research strategies used by a majority of the investigators in this

field were primarily concerned with how well the attitudes and certain personal characteristics of good, bad, and prospective drivers predicted accidents or violations in the chosen subjects. Correlation between personal characteristics and violation and accident rates is generally low. Attitude tests are of limited usefulness for screening. Social adjustment, attitude, and personality tests which could be used as predictive devices have not yet been devised.

Search terms: Driver attitudes; Driver behavior research; Driver license examination; Driver mental fitness; Driver personality; Driver psychological tests; Driver characteristics; Accident prevention; Problem drivers; Accident proneness; Surveys; Risk taking; Fear

HS-010 985 Fld. 3/4**YOUTHFUL DRIVING PROBLEMS AS PERCEIVED BY TEENAGERS AND THEIR PARENTS. A PILOT STUDY CONDUCTED FOR THE GOVERNOR'S COMMITTEE ON CHILDREN AND YOUTH, STATE OF WISCONSIN**

by C. Frazier Damron

Wisconsin Univ.

1966 30p 25refs
Report no. Safety-Res-Ser-1

The purpose of this study was to investigate and identify the perceptions of youthful driving problems which are held by teenagers and their parents, including the influence of parental attitudes and driving behavior, the extent to which parents and teenagers differ in their knowledge of driving laws and regulations, and difference of parent-teenager opinion as to solution of driving problems. Teenagers and parents show about the same average score on the test. All teenagers had completed a driver education course, but only 10-15% of

parents had such training. Problems which at least 40% of teenagers or parents felt to be major teen driving problems are discussed. Opinions on proposed safety legislation are described. The questionnaire is included, and further research recommended.

Search terms: Parents; Adolescent drivers; Driver behavior; Driver attitudes; Perception; Questionnaires; Traffic laws; Driver education; Safety laws; Parent child relations; Careless driving; Problem drivers

HS-010 986 Fld. 3/4; 5/4**MAN VS. CAR: WHERE SAFETY RESEARCH STOPS**

by Nat Wood

Published in *Machine Design* v40 n1 p44-5, 47 (4 Jan 1968)

There is a need for a set of technically complete, well organized and compatible tests of vehicle safety. Proposed tests will involve destructive testing of crashworthiness under dynamic conditions; nondestructive tests of vehicle dynamic performance under normal and abnormal conditions; driver testing and training under various conditions; quantitative evaluation and design of highway surfaces, design, and traffic control devices. Tests are illustrated for roll-over limit, lateral acceleration vs. steering, transient dynamic performance, defensive driving, steering forces, braking, and visibility.

Search terms: Vehicle safety; Vehicle handling; Nondestructive tests; Dynamic tests; Driver performance; Man machine systems; Steering; Braking; Rollover tests; Acceleration; Driver vehicle interface; Crashworthiness; Driving conditions; Driver tests; Highway design; Highway characteristics; Visibility; Defensive driving

3/6 Driver Licensing

HS-010 987 Fld. 3/6; 3/4

AN ABSTRACT OF MODIFYING NEGLIGENT DRIVER BEHAVIOR: EVALUATION OF SELECTED DRIVER IMPROVEMENT TECHNIQUES

by William C. Marsh

California Dept. of Motor Vehicles

1971 21p

Report no. RR-36(Abs)

The purpose of the study was to determine what is the most appropriate type of initial contact for problem drivers and what level of vigilance should be maintained in subsequent contacts. It was concluded that group educational meetings are successful with both male and female drivers; that hearings, administrative review, and warning letters are successful with women but not with men. From the cost benefit point of view, it is recommended that individual hearings should not be the first contact with negligent male drivers; that the use of reexamination should be limited; that purely educational meetings for both sexes or group meetings for men and individual hearings for women should be considered; that drivers who continue to violate should be called for individual hearings.

Search terms: Driver improvement; Driver improvement measurement; Warning letters; Problem drivers; Program evaluation; Male drivers; Female drivers; Benefit cost analysis; Driver license reexamination; Driver records; Driver behavior research

3/7 Drugs Other Than Alcohol

HS-010 988 Fld. 3/7

DRUG ABUSE IN PUBLIC TRANSPORTATION

Anonymous

Published in *Metropolitan* v67 n5 p34-5 (Sep-Oct 1971)

Alarmed by the staggering human and economic costs of having a drug abuser on the payroll, public transportation management has become increasingly sensitive to the drug problem. In New York City, the Transit Authority has retained the Laboratory for Chromatography in Bayside, New York, to test prospective employees for drug use. Urine samples collected from job applicants are turned over to the laboratory for extremely accurate testing by sophisticated analytical methods. The tests show if an individual has been taking heroin or other narcotics, the amphetamine and barbiturate families of drugs, tranquilizers, and commonly misused sedatives and analgesics such as Doriden and Darvon. Approximately four out of 100 prospective employees who have been approved for hiring, pending results of a final medical screening, are found to be drug abusers, and one out of 100 is a heroin addict.

Search terms: Drug addiction; Driver physical fitness; Public transportation; Urinalysis; Drug effects; Professional drivers

3/9 Impaired Drivers

HS-010 989 Fld. 3/9

SICK AND HANDICAPPED DRIVERS. A STUDY ON THE RISKS OF SUDDEN ILLNESS AT THE WHEEL AND ON THE FREQUENCY OF ROAD ACCIDENTS AND TRAFFIC OFFENCES IN CHRONICALLY SICK, DISABLED, AND ELDERLY DRIVERS

by Lars Ysander; B. Herner; B. Smedbey

Published in *Acta Chirurgica Scandinavica* Supp409 (1970)

81p 70refs

An investigation was conducted to determine what importance acute and chronic somatic diseases and permanent dis-

ablement have as risk factors in traffic. Procedures of collecting material and literature review are discussed. Overall, sudden illness causes about one per 1,000 of all accidents studied in Sweden. Aspects discussed include medical requirements for driver licensing in various countries; diabetic drivers without license restrictions; elderly male drivers with limited traffic experience; and physically disabled drivers.

Search terms: Handicapped drivers; Driver experience; Reviews; Diabetes mellitus; Epilepsy; Heart diseases; Sweden; Driver license restrictions; Driver license standards; International factors; Age factor in accidents; Driver physical fitness; Accident rates; Aged drivers; Problem drivers; Accident risks; Traffic law violators; Male drivers; Medical factor caused accidents; Driver mental fitness

3/11 Pedestrians

HS-010 990 Fld. 3/11

TWO EXPERIMENTS ON METHODS OF TRAINING CHILDREN IN ROAD SAFETY

by Helen V. Colborne

England Road Res. Lab.

1971 15p

Report no. RRL-LR-404

Two experiments were carried out to compare different methods of training children aged between six and eight in safe road behavior. The road crossing behavior taught was: crossing well away from parked vehicles, and the correct way to cross between two parked vehicles, if there is no alternative place to cross. Children were tested in a traffic garden before and after training. Training methods used involved colored slides and model vehicles. The method using slides was found to be more effective with the second situation; training with either method produced an improvement

3/11 Pedestrians (Cont'd.)**HS-010 990 (Cont'd.)**

in behavior with the first situation, but it was not established which method was the more effective. In a second experiment, children were given instruction in road crossing at a light controlled junction. The concept of crossing at the correct phase of traffic lights does not appear to be easy for young children to grasp. Children who had been trained in a traffic garden did better in a practical test than children trained in a classroom.

Search terms: Pedestrian education; Child safety education; Pedestrian behavior; Young pedestrians; Visual aids; Curricula; Training facilities

3/12 Vision**HS-010 991 Fld. 3/12****MOTOR VEHICLE OPERATION BY A PATIENT WITH LOW VISION: A CASE REPORT**

by Dennis K. Kelleher; Edwin B. Mehr; Monroe J. Hirsch

Published in *American Journal of Optometry and Archives of American Academy of Optometry* v48 n9 p773-76 (Sep 1971)

2refs

A 23-year old male albino with 20/100 vision (with best spectacle lenses) was able to obtain 20/40 vision with a 3X bioptic. With the telescope he was able to obtain a license to operate a motor vehicle in California. The patient's subjective impressions and observations are discussed, and a prism cap modification to the telescope is described.

Search terms: Driver license restrictions; Driver vision standards; Vision disorders; Eyeglasses; Telescopic systems; Albinism; Medical case reports

HS-010 992 Fld. 3/12**SMALL EYE MOVEMENTS AND VISUAL EFFICIENCY**

by D. C. West

England Road Res. Lab.

1971 36p 34refs

Report no. RRL-LR-402

Previous work by Foley-Fisher showed that a close relationship existed between the frequency of small involuntary eye movements (saccades) and vernier acuity. The present research is an extension of this work, using randomly selected untrained subjects rather than experienced observers. It was hoped that research would show the saccade frequency/acuity relationship to be good enough for prediction of acuity once the eye movement parameters were established by objective measurement. The relationships found were so poor that this was not possible. However, the general trend of the results was in agreement with previous work, the best indicator of good vernier acuity being the frequency of inter-saccadic intervals longer than about one second. This and other results support a hypothesis that vernier acuity is limited by an integration period defined in duration by the interval between saccades. Finally, a large body of eye movement data is presented.

Search terms: Visual acuity; Eye movements; Visual perception; Visual behavior; Vision tests; Measuring instruments; Linear regression analysis; Visual fields

HS-010 993 Fld. 3/12; 3/4**THE INFLUENCE OF VISUAL PATTERN ON PERCEIVED SPEED**

by G. G. Denton

England Road Res. Lab.

1971 28p 14refs

Report no. RRL-LR-409

The instability of the relationship between real speed and the sensation of speed experienced by the driver relative to the physical speed at which he is moving is investigated. The various contributing factors are outlined. Speed adaption is considered as a major factor responsible for errors in the driver's judgment of speed, and the hypothesis is made that by deliberately distorting the spatial geometry of the visual field it should be possible to counteract the effects of adaptation. The results of this experiment carried out on a simulator confirmed the possible value of such a technique. Proposals are made for future research into the control of behavior by the use of illusion particularly in the driving situation.

Search terms: Speed studies; Driving simulation; Velocity perception; Motion perception; Ride simulators; Field of view; Visual perception; Pavement markings; Variance analysis

4/0 OTHER SAFETY-RELATED AREAS**4/3 Cost Effectiveness****HS-010 994 Fld. 4/3; 2/4****DECISION ANALYSIS FOR INCREASED HIGHWAY SAFETY**

by Paul D. Berger; Arthur Gerstenfeld

Published in *Sloan Management Review* v12 n3 p11-23 (Spring 1971)

9refs

The limited funds available for improving the vast number of dangerous highway locations can be allocated more effectively through decision analysis. The method has been applied to many business problems. A decision analysis model is developed for highway safety and used to evaluate the dollar benefits

of various corrective strategies at high-accident locations.

Search terms: Decision theory; Accident costs; Highway improvements; Benefit cost analysis; Mathematical models; Priorities; Accident location; Decision making; Highway safety; Accident rates; Accident risks; Flow charts

4/7 Mathematical Sciences

HS-010 995 Fld. 4/7; 5/4

A COMPUTATIONAL SCHEME FOR MATCHING REQUIRED AND AVAILABLE POWER IN VEHICLE SIMULATION

by Roscoe L. Pershing

Deere and Co.

1971 5p 3refs
Report no. SAE-710634

Presented at a meeting of the SAE Mississippi Valley Section, 29 Apr 1971.

A computational scheme is described that will adjust the level of forward acceleration of a vehicle to allow the desired utilization of a power system in a vehicle performing a task requiring transport motion. The scheme is computationally efficient in that only about three trials are required to find the match point of power train and vehicle system.

Search terms: Vehicle performance; Power trains; Acceleration; Torque; Simulation models; Mathematical analysis; Slip

AVAILABILITY: SAE

4/8 Transportation Systems

HS-010 996 Fld. 4/8

THE SYSTEM: KEY TO FUTURE LOW LOSS OPERATIONS

by Henry H. Wakeland

National Transp. Safety Board

1970 9p
Report no. SAE-700200

Presented at the Automotive Engineering Congress, Detroit, 12-16 Jan 1970.

The National Transportation Safety Board study, *Compatibility of Standards for Drivers, Vehicles, and Highways*, points out that the many standards which might define integrated highway transportation systems have often been incompatible. The result is that the standards tended to block conceptualization of system problems in highway operation and safety. Compatible standards involving many national organizations are needed to facilitate the evolution of integrated highway transportation systems. Safety efforts are often based upon corrections of individual causes of accidents, but improved efficiency and safety results when the system is visualized and disciplined as a whole.

Search terms: Highway safety standards; Systems analysis; Systems engineering; Transportation systems; Safety engineering; Accident prevention; Uniformity; Transportation planning; National Transportation Safety Board

AVAILABILITY: SAE

HS-010 997 Fld. 4/8

FREQUENCY MANAGEMENT FOR VEHICLE COMMAND AND CONTROL. FINAL REPORT

IIT Res. Inst.

1971 99p
Report no. IITRI-E-6182; PB-202 366

Automatic Vehicle Location (AVL) systems were studied. This study concentrated on transportation aspects, both for buses and taxicabs, to illustrate the application to routed and random vehicles. The systems would also be useful in other areas. There is sufficient evidence that AVL systems are feasible. Several techniques were reviewed from the viewpoint of frequency allocation. The phase trilateration method operates in the land mobile bands which are very crowded and may require special FCC approval. Proximity and pulse trilateration methods operate higher in frequency but have potential radio frequency interference problems. Bandwidth requirements were investigated. Demonstrations of each type in an urban environment with tests of actual prototype hardware are needed.

Search terms: Radio communication; Automatic transportation systems; Public transportation; Vehicle location; Telecommunication; Transportation planning; Urban transportation; Data processing; Radio interference; Frequencies; Communication systems; Scheduling; Taxicabs; Demand scheduled buses; Buses

AVAILABILITY: NTIS as PB-202 366

HS-010 998 Fld. 4/8

TRANSPORTATION. BACKGROUND. ISSUES. 1971 WHITE HOUSE CONFERENCE ON AGING

by Joseph S. Revis

White House Conference on Aging

4/8 Transportation Systems (Cont'd.)

HS-010 998 (Cont'd.)

1971 59p 37refs

The first four sections of the paper discuss: the need for improved and adequate transportation systems; goals proposed by previous conferences, workshops, and other groups; knowledge available on the present transportation needs and problems of the elderly; and identifiable gaps in this area. The fifth section of the paper briefly discusses several major issues relevant to improving the transportation needs of older people.

Search terms: Transportation of aged; Transportation planning; Transportation studies; Transportation problems; Aging; Transportation pricing; Sociological factors; Residential location; Socioeconomic data; Public transportation usage; Travel patterns; Trip geography; Trip purpose; Modal choice; Urban transportation

AVAILABILITY: GPO \$0.65

HS-010 999 Fld. 4/8

AUTOMATION OF THE HIGHWAYS, AN OVERVIEW

by Sheldon C. Plotkin

Published in *IEEE Transactions on Vehicular Technology* vVT-18 n2 p77-80 (Aug 1969)

3refs

Highway automation must be evolutionary; beginning with a simple vehicle tracker to control braking and acceleration; addition of automatic steering with minimal highway department assistance in the 1980's; and new highways with

complete synchronous guidance in the 1990's. Previous vehicle tracker and partial automatic systems would become a backup system. The fully automatic system would lend itself to central traffic control.

Search terms: Automatic highways; Automatic headway control; Automatic steering control; Guidance systems; Automatic braking; Automatic control; Automatic acceleration control; Tracking; Sensors

HS-011 000 Fld. 4/8; 2/4

THE SCAFT GUIDELINES 1968. PRINCIPLES FOR URBAN PLANNING WITH RESPECT TO ROAD SAFETY

Sweden Statens Planverk

1968 36p
Report no. Pub-5

In cooperation with Statens Vägverk.

These principles are intended to serve as a guide in the planning of new urban areas but may also be applied to improvements of existing areas. Aspects examined are: design of the road network; design of the pedestrian network; design of cycle and moped tracks; diagrammatic examples of road networks; relationship between road accidents and the traffic environment; the need for applying principles to urban planning; design standards for motor roads. Examples of plans of several new Swedish communities are included.

Search terms: Urban planning; Highway planning; Highway design; Bike-way planning; Pedestrian safety; Design standards; Environmental planning; Sweden; Environmental factors; New towns; Accident factors

HS-011 001 Fld. 4/8; 4/7

THE SURVEY OF USER CHOICE OF ALTERNATE TRANSPORTATION MODES

by Thomas F. Golob

General Motors Res. Labs.

1970 22p 13refs
Report no. GMR-950

The author outlines some advantages of an economic utility theory approach to the estimation of demand for alternate transportation systems (modal split). An estimation model based on a utility theory application of a statistical inference technique is examined. Discussed in detail are the design and conduct of an attitudinal survey as the essential validation phase in the overall development of this model. Important steps are data collection, formulation of abstract attributes for system description, quantitative measurement of potential user attitudes, and selection of additional data about the consumer's modal choice which are necessary for the comprehensive evaluation of this model in comparison to other mode demand estimation techniques.

Search terms: Economic analysis; Urban transportation; Modal choice; Mathematical analysis; Questionnaires; Consumer preferences; Consumer acceptance; Modal split technique; Travel patterns; Transportation models; Attitudes; Forecasting; Transportation study methods; Statistical analysis; Surveys; Commuting patterns

5/0 VEHICLE SAFETY

5/4 Design

HS-011 002 Fld. 5/4

ELECTRICAL PROPERTIES OF GLASS AND ASBESTOS FORTIFIED THERMOPLASTIC RESINS

by John E. Theberge

LNP Corp.

1972 6p 5refs

Report no. SAE-720038

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

Mechanical and electrical properties of 22 glass- and asbestos- fortified thermoplastic resin systems are presented. Large increases in tensile and flexural strength are noted with the glass- and asbestos- fortified nylon compounds; increases for other fortified resins are also qualitatively detailed. Flexural modulus data also demonstrate the ability of fortifiers to increase rigidity dramatically. Unnotched izod impact strengths are generally reduced by addition of fiber fortifiers, while notched izod impact strengths are increased for some resin systems and decreased for others. Increases in heat deflection are generally realized. The d-c electric properties of dielectric strength and arc resistance are generally enhanced in glass fiber-fortified thermoplastic resins. The a-c electric properties of dielectric constant and dissipation factor are similarly increased. Both increases and decreases in volume resistivity data are noted with the addition of fiber fortifiers. Slightly reduced volume resistivities and increased dissipation factors at 60 Hz are noted with asbestos-fortified nylon resins. The addition of flame-retardant additives to fortified thermoplastic resins results generally in reduced physical and electrical properties.

Search terms: Electric properties; Mechanical properties; Asbestos reinforced plastics; Glass fiber reinforced plastics; Thermoplastics

AVAILABILITY: SAE

HS-011 003 Fld. 5/4

PLASTIC FILM TAPES FOR ELECTRICAL INSULATION

by Joel R. Urban

Minnesota Mining and Mfg. Co.

1972 6p

Report no. SAE-720037

Presented at the Automotive Engineering Congress, Detroit, 10-14 Jan. 1972.

In this day of specialization it is essential that electrical design engineers have a general background in insulating materials. This paper intends to provide some guidelines for the selection of proper insulation materials. The properties and construction of various types of electrical grade pressure sensitive tapes are discussed. The importance of compatibility, the consideration of corrosion, and the mechanical, electrical, thermal, environmental exposure, cost, and safety aspects of a given application are emphasized.

Search terms: Electric properties; Mechanical properties; Plastics; Adhesive; Wear resistance; Thermodynamic properties; Insulation tapes

AVAILABILITY: SAE

HS-011 004 Fld. 5/4; 4/6

IMPROVING AUTO DESIGN FOR IMPACT RESISTANCE, REPAIRABILITY AND OCCUPANT SAFETY

by Louis C. Lundstrom

General Motors Corp.

1971 7p

Presented to the National Association of Insurance Agents 75th annual convention, San Francisco, 23 Sep 1971.

Improvements associated with repairability and safety will add to the initial costs of cars but will decrease repair costs as well as save lives. Aspects described are energy absorbing bumpers; a damage rating system; improvements in repairability of parts which often suffer secondary damage; better towing equip-

ment to eliminate damage claims from improper towing; vehicle identification numbers; and passive restraints. The effects of these improvements on the insurance industry are mentioned.

Search terms: Crashworthiness; Occupant protection; Automobile repair costs; Automobile design; Safety design; Impact tolerances; Towing; Insurance industry; Energy absorbing bumpers; Damage severity index; Repairing; Secondary collisions; Damage costs

HS-011 005 Fld. 5/4; 4/7

A CORRECTION FACTOR INVESTIGATION OF A TURBOCHARGED DIESEL ENGINE

by Walter Bryzik

Army Tank-Automotive Command

1971 12p 6refs

Report no. SAE-710821

Presented at the National Combined Fuels and Lubricants, Powerplant and Truck Meetings, St. Louis, 26-29 Oct 1971.

The study's purpose was to evaluate the effect of dry ambient intake air pressure, ambient intake air temperature, engine speed, and humidity upon the performance of a turbocharged diesel engine. Each effect is examined individually and weighted in a final relationship for standardized horsepower. Power correction formulas, in a form readily comparable to typical correction functions, are derived from the results. Testing was conducted through the use of various special test procedures, calibrations, and test equipment. With computer aid, test evaluation was conducted by utilizing various analytical and graphical methods. An accuracy comparison between actual and calculated values of power correction is presented.

Search terms: Diesel engines; Engine tests; Engine operating conditions;

5/4 Design (Cont'd.)

HS-011 005 (Cont'd.)

Test equipment; Engine performance; Turbocharging; Air pressure; Operating temperature; Computerized test methods; Humidity

AVAILABILITY: SAE

HS-011 006 Fld. 5/4; 5/20; 5/17; 4/5

A PROCESS CONTROL SYSTEM FOR PRODUCTION DIESEL ENGINE TESTING

by Jack C. Ritter; Kenneth J. Mundy

Mack Trucks, Inc.

1971 9p
Report no. SAE-710820

Presented at the National Combined Fuels and Lubricants, Powerplant and Truck Meetings, St. Louis, 26-29 Oct 1971.

In order to optimize performance, data must be collected, analyzed, and rapidly transmitted into information. To meet these needs in production diesel engine testing, a process control computer system has been developed around the basic objective of establishing an accurate and regimented test program, which will provide more reliable information for analysis and action, increased test capacity, accurate history data, and a higher quality product. The basic design of such a system, the advantages to be gained, and the overall operation are described.

Search terms: Diesel engines; Computerized test methods; Engine tests; Data processing; Test equipment; Quality control

AVAILABILITY: SAE

5/6 Fuel System

HS-011 007 Fld. 5/6

FERRITIC STEEL PROVES DURABILITY IN THERMAL REACTOR TESTS

by David L. Chalk

Published in *SAE Journal of Automotive Engineering* v79 n8 p28-31 (Aug 1971)

A new, relatively inexpensive stainless steel was developed specifically for thermal reactors to replace costly nickel alloys. Older ferritic stainless steels lacked durability; a core of the new material was undamaged after 756 hot-cold cycles and the equivalent of 43,000 miles of heavy duty operation. Low phosphorous and lead fuels are desirable. Performance of the Du Pont reactor system on 1970 models approaches that required by 1975 standards.

Search terms: Exhaust emission control device tests; Thermal reactors; Stainless steels; Durability tests; Materials tests; Exhaust emission standards; Temperature endurance tests; Engine operating conditions; Phosphorus free gasoline; Lead free gasoline

HS-011 008 Fld. 5/6

OCTANE REQUIREMENT INCREASE IN 1971 MODEL CARS WITH LEADED AND UNLEADED GASOLINES

by H. A. Bigley, Jr.; B. D. Keller; M. G. Kloppe

Gulf Res. and Devel. Co.; American Oil Co.; Southwest Res. Inst.

1971 17p 5refs
Report no. SAE-710675

Report of a pilot program of the Road Test Group of the Motor Vehicle, Fuel, Lubricant, and Equipment Research Committee of the Coordinating

Research Council, Inc. Presented at the SAE National West Coast Meeting, Vancouver, 16-19 Aug 1971.

A pilot program on 10 pairs of 1971 model cars compared the influence of leaded and unleaded fuels on octane requirement increase (ORI). The cars were operated for 8,000-10,000 miles in the San Antonio area using a prescribed city-suburban driving schedule. One car of each pair was run on a commercially available leaded gasoline of 93 research octane number (ON) and the other on a specially prepared unleaded fuel of similar quality. Differences in ORI for the two fuels ranged from 0-3.5 ON within car pairs. Average ORI's were not significantly different, although results are tentative since octane requirements of some cars had not yet stabilized.

Search terms: Octane requirements; Gasoline quality; Lead free gasoline; Leaded gasoline; Road tests; Octane ratings; Vehicle mileage

AVAILABILITY: SAE

HS-011 009 Fld. 5/6

SITE RATING METHODS FOR NATURALLY ASPIRATED DIESEL ENGINES

by R. P. Sharma; P. D. Paranjpe; B. L. Maheshwari

Magniram Bangur Memorial Engineering Coll. (India); Birla Inst. of Technology and Science (India)

1971 11p 13refs
Report no. SAE-710823

Presented at the National Combined Fuels and Lubricants, Powerplant and Truck Meetings, St. Louis, 26-29 Oct 1971.

A laboratory setup for testing diesel engines at simulated altitudes (pressure and temperature according to international standard atmosphere data) up

to 14,000 feet is described. Attention is drawn to different bases which may be used in correcting engine performance (for example, constant fuel delivery, smoke density, indicated specific fuel consumption, and constant thermal loading method). The validity of derating formulas when applied to a small open-chamber, four-stroke, water-cooled diesel engine, running at constant speed, is discussed. The effect of increased speed under constant air-fuel ratio conditions is also examined.

Search terms: Diesel engines; Smoke meters; Engine operating conditions; Engine performance; Altitude; Air fuel ratio; Environmental factors; Fuel consumption; Power output; Power loss; Engine tests; Engine speeds; Thermal factors; Test equipment; Temperature; Pressure; Mathematical models

AVAILABILITY: SAE

HS-011 010 Fld. 5/6

COMPREHENSION AND PROGRESS IN OXIDES OF NITROGEN CONTROL

by Fred W. Bowditch

General Motors Corp.

1971 13p 30refs

Presented at the Conference on Scientific and Legal Questions of Environmental Protection sponsored by Trier-Kaiserslautern Univ., Kaiserslautern, Germany, 20-24 Sep 1971.

The difficulties of meeting 1976 emission standards are discussed and the Los Angeles smog problem is described. Formation of NO_x in the engine is reduced by lowering combustion temperature—lower compression ratio, retarded ignition, recirculation of exhaust gas, use of lean air-fuel mixtures, or use of rich mixtures to decrease available oxygen. All of these methods

reduce fuel economy or have other disadvantages. Reduction of NO outside the engine requires short-lived catalysts and produces noxious ammonia. Simultaneous control of nitrogen oxides, hydrocarbons, and carbon monoxide is very difficult and may require two-stage catalytic reactors.

Search terms: Exhaust gas recirculation; Vehicle air pollution; Exhaust emission control devices; Exhaust emission standards; Nitrogen oxides; Catalysts; Combustion; Fuel economy; Air pollution emission factors; Lean fuel mixtures; Rich fuel mixtures; Air fuel ratio; Smog; Los Angeles; Catalytic converters; Hydrocarbons; Carbon monoxide; Ammonia; Compression ratio; Ignition timing

HS-011 011 Fld. 5/6

DIESEL FUEL FILTER TESTING

by P. J. Bartlett

C.A.V. Ltd.

Oct 1971 6p 11refs
Report no. SAE-710814

Presented at the National Combined Fuels and Lubricants, Powerplant and Truck Meetings, St. Louis, 26-29 Oct 1971.

The published test methods for diesel fuel filters are reviewed in the light of the conditions in service. The measurement of diesel fuel filter performance in service is a long and costly process. The fact that most filters in service are choked by soft organic trace constituents of the fuel causes the greatest difficulty in laboratory testing. A test method which reproduces the organic choking effect has been described and is satisfactory for comparative tests; it has not been adopted as a standard owing mainly to difficulties associated with variability of the choking life measurement. A possible solution to this problem is suggested.

Search terms: Fuel filters; Diesel fuels; Laboratory tests; Fuel injection; Research methods

AVAILABILITY: SAE

HS-011 012 Fld. 5/6

CATALYTIC CONVERTERS

by T. V. De Palma

Published in *Automobile Engineer* v61 n10 p23-4, 27 (Oct 1971)

The most important feature of any device to limit exhaust emissions is that it should function as soon as possible after the engine has been started. Catalysts must withstand operating environments and the catalytic converter design must be matched to the engine. Tests of experimental converters on domestic and foreign cars show performance approaching the 1975 emission standards.

Search terms: Catalytic converters; Catalysts; Exhaust emission control device tests; Exhaust emission standards; Engine operating conditions; Foreign automobiles

5/10 Lighting Systems

HS-011 013 Fld. 5/10

HIGH PERFORMANCE HEADLAMPS

by J. B. Davey

Published in *Autocar* v135 n3938 p-13-7 (16 Sep 1971)

Recent developments in seven-inch round headlamps of standard and halogen type are evaluated by photography of an illuminated road scene and a screened image. Constraints of European standards are noted, and main and dipped-beam patterns related to various driving conditions. British and European headlamps are compared.

5/10 Lighting Systems (Cont'd.)

HS-011 013 (Cont'd.)

Search terms: Headlamp design; Headlamp standards; Headlamp tests; Great Britain; Europe; Quartz halogen tungsten headlamps; Low beamed headlamps; Performance characteristics

5/14 Occupant Protection

HS-011 014 Fld. 5/14

AUSTRALIAN STANDARD SPECIFICATION FOR RETRACTORS FOR CAR SEAT BELTS. DRAFT

Standards Assoc. of Australia

1969 11p
Report no. Doc-1462

A draft for a standard setting out requirements and test procedures for motorists' seat and shoulder belts with retractors and for retractors as separate items is presented. Various types of retractors are defined, but only those capable of locking are considered for specification. Proposals of the Draft International Standards Organization Recommendation are followed. Appendices specify tests for durability, corrosion and dust resistance, withdrawal and retracting force, and locking of emergency locking retractors.

Search terms: Seat belt reels; Seat belt assemblies; Seat belt standards; Restraint system tests; Test equipment; International factors; Australia

HS-011 015 Fld. 5/14; 5/20

ROPS SAFETY COMPLIANCE TESTING

by Robert W. Weed; Hartwell C. Davis

Lockheed Propulsion Co.

1971 10p
Report no. SAE-710694

Presented at the National Farm, Construction and Industrial Machinery Meeting, Milwaukee, 13-16 Sep 1971.

This paper describes the static test of construction equipment roll-over protective structures (ROPS) as performed in accordance with the applicable SAE Recommended Practices. Details of the test facility are presented, including test fixturing concepts and pertinent design calculations. The heavy equipment tie-down methods and restraint systems are shown. Data acquisition accuracy and methods are described. Data from several tests are compared with data from SAE committee files.

Search terms: Construction vehicles; Compliance tests; Static tests; Rollover protective structures; Loading tests; Deflection

AVAILABILITY: SAE

5/15 Propulsion Systems

HS-011 016 Fld. 5/15

POWER FOR 1984? THE FUEL CELL SHOWS PROMISE

by J. R. Daniels

Published in *Autocar* v135 n3933 p4-7 (12 Aug 1971)

Some popular misconceptions seem to have grown up about fuel cells, what they are, and what they can do. As a result of recent research work in several countries, there exists the possibility that they could form practical power plants for cars in the 1980's. The author describes how scientists at the Thornton Research Centre of Shell Research Ltd. have already shown that fuel cells can be used to power a car.

Search terms: Fuel cells; Electric automobiles; Hydrazine air fuel cells;

Methanol air fuel cells; British vehicles
Propulsion systems; Batteries

HS-011 017 Fld. 5/15; 4/7

HOW TO MINIMIZE SIZE OF CONDENSER FOR STEAM CAR

by D. O. Stuart; R. A. Dusatko; C. F. Zoucha

Published in *Automotive Engineering* v79 n10 p33-7 (Oct 1971)

Analysis based on the Reynolds analogy between fluid function and heat transfer shows the relationship of condenser size to engine efficiency, condensing temperature, and temperature difference between condenser and airstream. Ratio of fan power to driveshaft power should be three to eight for minimum heat transfer surface, although noise and efficiency factors may require a larger condenser.

Search terms: Steam condensers; Steam engines; Thermodynamics; Rankine cycle engines; Equations; Steam automobiles; Reynolds number; Engine operating conditions

5/22 Wheel Systems

HS-011 018 Fld. 5/22

FATIGUE PERFORMANCE OF TIRE BELT CORDS

by P. A. Lockwood; W. M. Edmunds; G. W. Grimm

Published in *Rubber Chemistry and Technology* v44 n4 p946-51 (Sep 1971)

Srefs

Presented at a meeting of the Division of Rubber Chemistry, American Chemical Society, Miami Beach, 27-29 Apr 1971.

A test method was developed to evaluate tire belt cords and belt fabric in dynamic axial fatigue. This paper describes the correlation of that test with tires built and tested in wheel and track tests, designed, as was the dynamic fatigue test, to fail cords at an accelerated rate. Correlation between ranking of cords in laboratory evaluation and the performance rating of tires built with these cords as the belt reinforcement is good.

Search terms: Road tests; Laboratory tests; Tire cord tests; Fatigue tests; Tire test equipment; Tire performance; Rubber compounds; Accelerated tests; Materials tests; Wear tests; Dynamic tests; Tire loads

NHTSA DOCUMENTS

NHTSA Accident Investigation Reports

HS-600 779 Fld. 1/3; 5/2

MULTIDISCIPLINARY ACCIDENT INVESTIGATION REPORT. MONARCH PASS—SCHOOL BUS ROLLOVER

by E. Flamboe; J. M. Keryeski; D. Bischoff

National Hwy. Traf. Safety Administration

1972 129p

Report for 11 Sep 1971-31 Mar 1972.
Cover title: *Monarch Pass, Colorado Schoolbus Crash*

The school bus driver lost control of vehicle speed while descending an 11-mile section of downgrade. The driver was apparently unaware of the limited fade resistance of the service brakes and used them as a primary method of retardation. While descending the pass he realized he was traveling too fast or was experiencing brake fade. He therefore

attempted to downshift the rear axle and transmission. The rear axle went into a free wheeling state, losing control of vehicle speed. The bus continued down the pass four more miles in this condition. The driver then chose to leave the highway to avoid a collision with traffic. The bus rolled over 2½ times, ejecting 39 of the 48 passengers. There were 9 fatalities, all totally or partially ejected. The side posts failed and the roof shifted to the left, deforming down to the level of the seat backs. All left side posts completely separated.

Search terms: School bus accidents; Mountain driving; Multidisciplinary teams; Accident investigation; Accident case reports; Rollover accidents; Brake fade; Failure caused accidents; Ejection; Deformation; Driver emergency responses; Precrash phase; Crash phase; Loss of control caused accidents; Body failures; Rear axles; Transmissions; Fatalities; Speed control; Ran off road accidents; Roof failures; Injury severity; Accident severity; Postcrash phase; Environmental factors; Accident location; Accident factors; Accident causes; Colorado

AVAILABILITY: NTIS

NHTSA Contractors Reports

HS-800 551 Fld. 3/2; 4/7; 5/14

HSRI THREE DIMENSIONAL CRASH VICTIM SIMULATOR: ANALYSIS, VERIFICATION, AND USERS' MANUAL, AND PICTORIAL SECTION. FINAL REPORT

by D. H. Robbins; R. O. Bennett; V. L. Roberts

Michigan Univ. Hwy. Safety Res. Inst.

1971 287p 33refs
Contract FH-11-6962
Report no. HSRI-Bio-M-70-9

Report for 1 Jan 1969-30 Jun 1971.

The development and use of mathematical models for the simulation of occupant kinematics during crash are described. The model was developed as a tool to study advanced concepts and designs of seat-restraint systems from the viewpoint of occupant protection. After a discussion of the state of the art of crash victim mathematical modeling, an analytical description of the HSRI three-dimensional crash victim simulator is presented. This model consists of a segmented, three-mass dynamic model of a human interacting with the interior of a vehicle in a full six degree of freedom crash. The degree to which predictions of the model agree with experimental impact sled test data is presented, together with a users' manual.

Search terms: Occupant modeling; Occupant kinematics; Occupant protection; Mathematical models; Simulation models; Degrees of freedom; Impact sleds; Crash response forecasting; Computerized simulation; Equations of motion; Impact forces; Human body simulation; Restraint systems; Seat loading measurement; Model tests; State of the art studies;

AVAILABILITY: NTIS

HS-800 613 Fld. 3/7; 3/4

THE STUDY OF POSSIBLE INFLUENCES OF LICIT AND ILLICIT DRUGS ON DRIVER BEHAVIOR. FINAL REPORT

by S. William Berg; John T. Fryback; Donald M. Goldenbaum; Ralph K. Jones; Kent B. Joscelyn; Roger P. Maickel; William Z. Potter; Joseph Zabik

Indiana Univ.

1971 137p 59refs
Contract FH-11-7244
Report no. FH-11-7244-S-71-1

Report for 11 Jan - 31 Aug 1971.

The study investigated the relationship between accidents and drug use. Tests

NHTSA Contractors Reports (Cont'd.)

HS-800 613 (Cont'd.)

were conducted to estimate the incidence of drug presence in the blood among college student drivers just involved in a traffic accident and among college student drivers who were on the road at the same time. Both groups were interviewed to identify drug usage patterns. The major conclusions were: there was no evidence that accident-involved subjects had a greater proportion of positive blood sample readings than control subjects; drug usage was statistically unrelated to the number of accidents subjects had incurred in their driving lifetimes; driving history and other factors were more strongly related to accidents than drug usage. A large-scale survey is recommended to develop statistically reliable data to describe the nature of the drug-impaired driver problem.

Search terms: Drug effects; Drug addiction; Drug caused accidents; Driver behavior; Accident rates; Blood analysis; Interviews; Problem drivers; College students; Hallucinogens; Young adult drivers; Statistical analysis; Regression analysis; Marijuana; Driver sex; Driver personality

AVAILABILITY: NTIS

HS-800 616 Fld. 1/2; 1/3

AUTOMOTIVE CRASH INJURY RESEARCH (ACIR). ANNUAL REPORT 1968-1969

Cornell Aeronautical Lab., Inc. ACIR

1969 46p 86refs
Contract FH-11-7098
Report no. CAL-VJ-2721-R 10

General activities of the Cornell Aeronautical Laboratory Automotive Crash Injury Research Program from 1 Nov 1968 to 31 Oct 1969 are described.

Sponsorship was provided jointly by the National Highway Traffic Safety Administration and the Automobile Manufacturers Association. The purposes of research are identification of injury causes in vehicle accidents, development of countermeasures, and measurement of the effectiveness of corrective injury and death countermeasures in use on production vehicles. The epidemiological concept is used. Abstracts of ACIR reports 1954-1968 are included, together with the injury severity index and vehicle damage severity index used in research.

Search terms: Injury research; Injury severity index; Damage severity index; Injury prevention; Vehicle safety; Safety device effectiveness; Fatality prevention; Epidemiology; Annual reports; Injury causes; Abstracts; Bibliographies; Accident research; Accident investigation; Cornell Aeronautical Laboratory

AVAILABILITY: NTIS

HS-800 617 Fld. 1/3

MULTIDISCIPLINARY ACCIDENT INVESTIGATION. FINAL REPORT 1970-71

by Fogarty; Sudduth; Freeman; Haviland
Miami Univ., Fla.

1971 221p 14refs
Contract FH-11-7224

Case summaries of 25 in-depth accident investigations are given, together with material on social factors involved in severe vehicle crashes. Team organization, Dade County accident data, team responsibilities, findings, and exhibits of field forms are included. Data on fatally injured drinking drivers are reviewed.

Search terms: Statistical analysis; Accident investigation; Multidisciplinary teams; Accident case reports; Sociological factors; Accident severity;

Miami; Accident causes; Accident factors; Drinking drivers; Driver intoxication; Epidemiology; Time of accidents; Fatalities; Accident report forms; Age factor in accidents; Sex factor in accidents; Day of week; Drug effects; Alcohol effects; Precrash phase; Crash phase; Postcrash phase; Accident statistics; Driver characteristics; Environmental factors; Marital status; Blood alcohol levels; Accident responsibility

AVAILABILITY: NTIS

HS-800 618 Fld. 3/12; 3/2

DRIVER EYE POSITION AND CONTROL REACH ANTHROPOMETRICS. VOL. 1. STATIC EYE POSITION, CONTROL REACH AND CONTROL FORCE STUDIES. FINAL REPORT

by W. E. Woodson

Man Factors, Inc.; Dunlap and Associates, Inc.

1971 328p 106refs
Contract FH-11-7619
Report no. MFI-71-117

Report for 1 Jul 1970-31 Oct 1971.
Subcontracted to Dunlap and Associates, Inc.

The purpose of this study was to develop criteria for establishing reach and ergonomic standards for the positioning and designing of motor vehicle controls, reference standards for evaluating exterior field of view from vehicles, and to create and demonstrate a tool for measuring how well newly designed vehicles comply with anthropometric standards. The questions studied were: what constraining limits for hand and foot-operated controls would assure that most drivers wearing restraint systems can reach them; how much control force is acceptable to assure that most drivers can manipulate controls adequately; where are drivers' eyes while performing

typical tasks; and what method or tool should be used to measure the effectiveness of a given vehicle in meeting the requirements imposed by driver reach.

Search terms: Driving task analysis; Restraint system usage; Ergosphere; Control location; Eye location; Anthropometry; Human body size; Man machine systems; Field of view; Eyellipse; H point; Mathematical analysis; Steering force; Driver vehicle interface; Leg motion range; Pedal force; Braking forces; Measuring instruments; Design standards; Human factors engineering; Females; Males; Arm motion range; Hand motion range; Laboratory tests; Instrument panel design

AVAILABILITY: NTIS

HS-800 619 Fld. 3/12; 3/2

DRIVER EYE POSITION AND CONTROL REACH ANTHROPOMETRICS. VOL. 2. DYNAMIC EYE POSITION STUDY. FINAL REPORT

by W. E. Woodson

Man Factors, Inc.

1971 125p 12ref
Contract FH-11-7619
Report no. MFI-71-117

Report for 1 Jul 1970-31 Oct 1971.
Subcontracted to Dunlap and Associates, Inc.

Cyclopean eye positions of drivers were measured relative to vehicle reference points during normal driving activities in late model vehicles. The measures were related to eye position measures made in static situations in the same vehicles and in laboratory studies employing vehicle mock-ups. Findings indicate that drivers exhibit substantial head tilt not observed in static situations; that shoulder belts restrict eye position excursions; that a large field of view periscopic-type mirror

virtually eliminates eye position shifts and substantially reduces variability in eye position during freeway lane changes and merges; that combining within-driver eye position variability and between-driver variability results in eyellipses which are enlarged substantially only in the lateral dimension; and that there is no consistent change in dynamic eye position over extended driving or in different driving environments.

Search terms: Driving task analysis; Eye location; Control location; Anthropometry; Human body size; Man machine systems; Field of view; Eyellipse; Restraint system usage; Mathematical analysis; Ergosphere; Head motion range; Shoulder harness usage; Head movement; Freeway driving; Lane changing; Merging; Driving conditions; Static tests; Laboratory tests; Road tests; Automobile models; Periscopic rearview mirrors; Driver vehicle interface

AVAILABILITY: NTIS

HS-800 623 Fld. 5/6

AN ASSESSMENT OF AUTOMOTIVE FUEL SYSTEM FIRE HAZARDS. SUMMARY REPORT

by Neva B. Johnson

Dynamic Science

1971 32p 2refs
Contract FH-11-7579
Report no. 2310/20-71-45

An integrated program of vehicle analyses, fuel system component tests, and full-scale vehicle tests was conducted to determine automotive fuel system fire hazards in vehicles containing fuel evaporative emission control devices. While many evaporative emission control devices are complex, most do not increase fire hazard as long as system integrity is maintained. However, loss of system integrity could lead to fuel spillage and increasing fire hazard. Fuel

system damage may occur during front, rear, or side impacts, resulting in massive fuel spillage. Rollover accidents always spill fuel from the carburetor and sometimes from other components. Rear fuel tanks are particularly likely to be damaged in rear end impacts. Based on the results of this study, crashworthy fuel system modifications were recommended and performance standards for fuel system integrity were proposed.

Search terms: Crashworthy fuel systems; Crashworthy fuel tanks; Evaporative emission control devices; Accident caused fires; Rollover accidents; Rear end collisions; Front end collisions; Side impact collisions; Fire prevention; Vehicle fires; Fuel system failures; Fuel tank leakage; Fuel tank rupture; Damage; Fuel tank location; Carburetors; Performance characteristics; Performance tests; Impact tests; Impact tolerances; Automobile models

AVAILABILITY: NTIS

HS-800 624 Fld. 5/6

AN ASSESSMENT OF AUTOMOTIVE FUEL SYSTEM FIRE HAZARDS. FINAL REPORT

by Neva B. Johnson

Dynamic Science

1971 282p 14refs
Contract FH-11-7579
Report no. 2310/20-71-44

An integrated program of vehicle analyses, fuel system component tests, and full-scale vehicle tests was conducted to determine automotive fuel system fire hazards in vehicles containing fuel evaporative emission control devices. While many evaporative emission control devices are complex, most do not increase fire hazard as long as system integrity is maintained. However, loss of system integrity could lead to fuel spillage and increasing fire hazard. Fuel

NHTSA Contractors Reports (Cont'd.)

HS-800 624 (Cont'd.)

system damage may occur during front, rear, or side impacts, resulting in massive fuel spillage. Rollover accidents always spill fuel from the carburetor and sometimes from other components. Rear fuel tanks are particularly likely to be damaged in rear end impacts. Based on the results of this study, crashworthy fuel system modifications were recommended and performance standards for fuel system integrity were proposed.

Search terms: Crashworthy fuel systems; Crashworthy fuel tanks; Evaporative emission control devices; Accident caused fires; Rollover accidents; Rear end collisions; Front end collisions; Side impact collisions; Fire prevention; Vehicle fires; Fuel system failures; Fuel tank leakage; Fuel tank rupture; Damage; Fuel tank location; Carburetors; Performance characteristics; Performance tests; Impact tests; Impact tolerances; Automobile models

AVAILABILITY: NTIS

HS-800 625 Fld. 3/1; 3/4

INFLUENCES OF ALCOHOL UPON DRIVING IN AN IN- STRUMENTED CAR. ANNUAL REPORT

by M. W. Perrine; M. Stephen Huntley, Jr.

Vermont Univ.

1971 42p 25refs
Contract FH-11-7469

Report for 28 Apr 1970-27 Apr 1971.

In each of two independent experiments, four high extravers and four lower extravers drove an instrumented car

through a closed pylon-defined course, on each of two experimental days, after ingestion of alcohol and a placebo beverage, and with and without a concurrent mental loading task requirement. Influence of alcohol upon tracking accuracy and control use behavior depended upon the particular controls observed, and was associated with driver personality and driver priorities concerning accuracy and speed. Alcohol significantly increased accelerator use regardless of personality or priorities, but its influence on steering behavior seemed more susceptible to individual differences. In one study the loading task requirement significantly reduced the accuracy-degrading effects of alcohol, but in the subsequent study it did not. Heart rate variation was reduced by alcohol.

Search terms: Instrumented vehicles; Driver personality; Alcohol effects; Driving task analysis; Driver performance; Driver tests; Priorities; Tracking; Steering; Speed patterns; Loading (operator performance); Heart rate; Vehicle control; Accelerator pedals; Driver behavior research; Drinking drivers; Automobile driving ranges

AVAILABILITY: NTIS

HS-800 637 Fld. 5/22

PHENOMENOLOGICAL RE- SEARCH INTO FAILURE MECH- ANISMS OF CORD REINFORCED RUBBER SYSTEMS. FINAL RE- PORT

by G. A. M. Butterworth; M. M. Platt; S. D. Hoenshell; L. Barish; R. E. Erlandson

Fabric Res. Labs., Inc.

1971 133p 22refs
Contract FH-11-6090
Report no. FRL-678 91

Degradation of cord reinforced rubber test systems during idealized "in tire"

strain cycling is described. This strain cycling was a compromise between rate, magnitude, and waveform, simulating actual in tire behavior and being predominately compressive, thereby inducing classic cord fatigue failure. The ultimate objective was to describe the origin and propagation of cord in rubber degradation for test systems which experienced high strain rate loading, strain cycles, and temperatures encountered in normal and abusive tire use. It was concluded that cord failure is a system response involving unique interactions between the adhesive, the cord, and the rubber stock. Adhesive strength does not appear to be as important as adhesive functionality and its ability to permit cord and rubber volumetric deformation while maintaining adhesive continuity between them. Retention of cord strength depended upon residual intact filaments and their strength.

Search terms: Tire cord tests; Tire failures; Fatigue tests; Wear tests; Tire wear; Rubber; Adhesives; Stress measurement; Stress strain characteristics; Polyester tires; Tire materials; Materials tests; Nylon tires; Tire defects

AVAILABILITY: NTIS

HS-800 638 Fld. 5/18

THE SKIDDING OF VEHICLES, A DYNAMIC ANALYSIS. FINAL REPORT

by E. A. Saibel; S. L. Chiang

Carnegie-Mellon Univ.

1971 12p 12refs
Contract FH-11-6090

Analytical results have been obtained on the steady state steering responses of automobiles under disturbances such as sudden braking, accelerating in a straight path, road camber, transient response of steering inputs, and the effects of road and tire characteristics of the auto. The objective was to set up a general

MAY 26, 1972

NHTSA DOCUMENTS

model of an automobile, establish the criteria of skidding, and to see what factors influence stability, handling, and skidding. Many factors of man, vehicle, and highway can now be connected and predictions made of what happens up to the onset of skidding.

Search terms: Skidding; Steady state; Steering; Braking; Acceleration; Camber; Highway characteristics; Tire characteristics; Automobile modeling; Automobile stability; Automobile handling; Forecasting; Man machine systems; Driver vehicle road interfaces; Tire side forces; Vehicle dynamics

AVAILABILITY: NTIS

HS-800 656 Fld. 3/1; 3/5

ALCOHOL AND DRIVING: A CURRICULUM FOR DRIVER EDUCATORS

American Driver and Traf. Safety Education Assoc.

1971 87p 37refs
DOT-HS-101-I-144

This material, designed for teachers, provides behavioral objectives, basic concepts, learning activities, evaluative devices, and references. The purpose of the manual is to provide driver educators with guidelines for developing improved student learning experiences regarding alcohol abuse and traffic safety; and to recommend strategies for implementing better personal decisions concerning alcohol abuse.

Search terms: Alcohol usage deterrents; Alcohol usage; Alcohol education materials; Alcohol effects; Curricula; Instruction materials; Instructors; Driver education manuals; Behavior; Attitudes; Safety propaganda

AVAILABILITY: NTIS

NHTSA Imprints

HS-820 182 Fld. 2/0

MANAGING OUR VEHICULAR ENVIRONMENT

National Hwy. Traf. Safety Administration

1972 114p

The purpose of this "action manual" is to unite young people in the highway safety movement and to foster communication between groups and individuals concerned with highway safety programs. A number of highway safety clippings from newspapers and magazines are reproduced. Much of the material deals with the problems of young drivers.

Search terms: Highway safety programs; Adolescent drivers; Young adult drivers; Manuals; Safety propaganda; Vehicle safety

AVAILABILITY: NHTSA

HS-820 203 Fld. 5/6

EVALUATION OF LENGTH-OF-STAIN GAS INDICATOR TUBES FOR MEASURING CARBON MONOXIDE IN AIR. TECHNICAL NOTE

by Earl C. Klaubert; Joseph C. Sturm

Department of Transp., Transp. Systems Center

1971 16p
Report no. DOT-TSC-NHTSA-71-8

Techniques for measurement of carbon monoxide in air are useful in many aspects of automotive safety. Concentrations ranging from less than 0.01 to about 10% CO are of interest. Gas indicator tubes for carbon monoxide are potentially useful for this application, and their degree of precision was studied. A breadboard model of a semi-automated analyzer was constructed. The coiled tube sample reservoir permitted gas transport by following purge air with little mixing or dilution. One brand and type of indicator tube was evaluated at several different CO concentrations, gas flow rates, and two different sample volumes. All tests were conducted at room temperature. The averaged values for 10 tests at each experimental condition were found to fit very well to power-curve equations of the type predicted by theoretical analysis. The standard deviations for each group of tests indicated that any single measurement might differ from the true value by plus or minus 30%.

Search terms: Carbon monoxide; Measuring instruments; Gas analyzers; Air pollution measurement

AVAILABILITY: NTIS

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

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VIII	Regional Administrator, NHTSA, 9393 West Alameda Avenue, Lakewood, Colorado 80226, Tel: 303-324-3253 (Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming)
IX	Regional Administrator, NHTSA, 450 Golden Gate Avenue, Box 36112, San Francisco, California 94102, Tel: 415-556-6415 (Arizona, California, Hawaii, and Nevada)
X	Regional Administrator, NHTSA, 5140 Federal Office Building, Seattle, Washington 98104, Tel: 206-442-5934 (Alaska, Idaho, Oregon, and Washington)